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ABSTRACT

An examination of the effect of intervention strategies utilized in the Research and Development Utilization (RDU) Program on school improvement outcomes was the subject of this document. The basic Federal/State approaches to support local school improvement efforts are a coercive/manipulative approach, direct support, or indirect support. Indirect support may take the form of technological or process/people support. RDU strategy, however, emphasizes voluntary involvement and small amounts of federal seed money funding. The major emphasis is on providing technological and process/people support in a local school improvement effort. RDU intervention combines strategies which produce important predictor variables. These variables are product quality, product characteristics, and breadth of participation. The degree to which the outcome is achieved is largely a function of the internal processes and the less manipulable site characteristics. (DWH)

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PRODUCT, PROCESS AND PEOPLE IN THE R&D UTILIZATION PROGRAM
THE POWER OF THE INTERVENTIONS

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I. Introduction

The objectives of this paper are to examine the effect of the strategies utilized in the R&D Utilization (RDU) Program* on school improvement outcomes, and to further examine the relative power of the RDU "intervention" as compared to the "non manipulable characteristics" of the schools involved.

II. The RDU Strategy: Where It Fits Into a Larger Policy Picture

Before discussing the impact of the RDU intervention strategies, it is useful to place the RDU intervention approach in the context of other approaches to promoting school change. There are four basic Federal/State approaches to support local school improvement efforts:

- a coercive/mainpulative approach -- based on legislation, regulation, court orders, etc. This approach is clearly the most efficient in producing massive local change, and is typical of efforts to foster school desegregation, for example.
- direct support -- providing money to the school. This may take the form of "seed money", which is temporary funding for improvement activities, or may occur as a result of targeted, more permanent formula funding, such as Title I.
- indirect support, which can take two forms:
  - technological support: support of materials and program development, and of making these new innovations available;
  - process/people support: support through the provision of free or very inexpensive technical assistance, training, consultation, or other human resources.

The major federal strategy in supporting school improvement has been a combination of direct support through formula funding of various types, combined with relatively massive regulations which require many, if not most, districts to make changes in their curriculum, staffing, use of time, space and facilities, and other areas of school functioning.

The RDU strategy, on the other hand, looked quite different from this: it emphasized voluntary involvement and small amounts of seed money funding.

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*This paper is the second of two presentations on the Study of the RDU Program in a Symposium on The Use of External Resources in Local School Improvement. For a full description of the RDU Program and its Outcomes, see the companion paper, Molitor (1981), and the Final Report of the Study, Louis et al., forthcoming in the summer of 1981.

It also put a major emphasis on providing both technological and process/human support in a local school improvement effort.

III. Stimulating Voluntary Change in Schools: Arguments Against the Effectiveness of Small Scale External Intervention

Although the RDU Program involved a rather heavy level of effort on the part of local school personnel, it was in large measure an external intervention. There is an accumulating literature, however, that suggests that local school improvement activities should be "home grown" and probably locally initiated:

- Schools tend to make such major adaptations in externally developed materials that the need for external development may be questioned (Berman and McLaughlin, 1977; Charters and Pellegrin, 1973; Stearns, et al, 1977).
- Externally provided technical assistance is typically not positive related to school improvement outcomes (Berman and McLaughlin, 1977). Even where it is, it is much less important than the roles played by internal change agents (Miles, et al, 1978).
- The organizational characteristics of schools as a class mitigate against effective, externally provided school improvement (Deer, 1976; Weick, 1976) although not necessarily against more localized improvement.
- The organizational characteristics of schools overwhelm the characteristics of the external intervention: local structure, culture and staffing/pupil characteristics are the major determinant of innovative behavior (Rosenblum and Louis, 1981; Hage and Aiken, 1979;).
- Whether or not innovations are adopted, implemented and maintained is not a rational, predictable process, but is conditioned by critical events, changes in the process, "politics" and other features (March and Olsen, 1974.)

Some of these arguments are based on the primary potency of local characteristics; others are more related to the lack of potency of external intervention. In the present paper, we first examine the degree to which the RDU interventions were potent as school improvement strategies. Second we will examine the importance of local effects; and finally, we will draw some conclusions about effectiveness of both the intervention and local characteristics on the

outcomes of the program. Data for these analyses are derived from a subset of up to 90 schools which participated in the program. In addition to survey data from teachers and principals, data sources included either a "mini-ethnography" or 4-5 day site visits by Abt Associates staff.*

*For an extensive description of the methodology for the study, see "Policy Researcher as Sleuth," Louis, 1981.

IV. Program Effects: The Power of the Intervention

The RDU intervention contained several strategies: small amounts of direct funds to local school sites; technological support through the introduction of externally developed programs, practices and materials; external human assistance to schools engaging in a problem solving process; and stimulation of required internal problem solving activities. The effect of each will be discussed in turn:

A. Money

Financial resources directly available from RDU to local sites were very limited: $1000-$8000 per site. Project (federally) contributed costs were but a fraction of the actual costs of the innovative process. Cost data were obtained from 27 sites, through intensive examination of records, plus interviews with major participants.

1) Variables measured: two types of costs were identified:

- Direct costs: Specific RDU activities paid for directly with RDU grant funds, e.g., purchase of the R&D product; compensation of substitutes to release teachers for RDU activities, etc.
- Inkind costs: Specific RDU activities not charged to an RDU grant. Inkind costs are incurred when district funds and other non-RDU sources provide resources to the RDU effort, or when personnel time is contributed to RDU without being directly compensated for by RDU program funds.

2) Findings and Discussion

In RDU, program funds accounted, on average, for only 20% of the local site costs of participating in the program. Thus, typically, each dollar of federal money leveraged about four more from the school and school district, or from other sources.

The total costs of the project (direct plus in-kind) and the percentage of costs that were in-kind were both correlated with five basic outcomes measures for the RDU program (see Table 1). The results indicate that the total costs of the activities at the site level are not significantly correlated with any outcome measure (although the trend indicates that the higher

the expenditures, in total, the less likely that the project caused significant positive outcomes.)

The percentage of in-kind costs was a more powerful positive predictor of success. The data in Table 1 suggest that a school's commitment of in-kind resources reflect or motivates a desire on the part of participants to achieve successful outcomes. Increasing proportions of in-kind costs were positively associated with greater organizational change, greater incorporation of the R&D product, and more pronounced personal impacts on teachers.

B. Technological Support: The Impact of R&D Products

Each project consolidated a "knowledge base" of externally developed programs, practices, or products (with an emphasis on those which had been field tested or validated) and which were made available, as appropriate, to local sites as solutions to their identified problem or need.

1) Variables measured:

- perceived quality of the product;
- perceived difficulty of implementation;
- local materials development;
- adaptation of R&D product before implementation;
- adaptation of R&D product after implementation;
- whether the product was field tested or validated;
- the relative advantage of the product compared to prior practice;
- the match between the defined problem and the product;
- the complexity of the product;
- the reversability of the product;
- product included adequate guidance for implementation.

2) Findings and Discussion:

Table 2 reveals that product characteristics are very powerful predictors of school level outcomes -- with the exception of process incorporation. The percentage of variance explained by three or four product variables ranges from 46% in the case of reports that the problem was solved to 10% in the case of process incorporation. The several variables that enter more than

one equation show interesting patterns. Product quality, which reflects the degree to which teachers and principals rate the products as relevant, applicable to their situation, and providing a genuinely new way of doing things, is particularly important in predicting the degree to which the problem was solved, the level of program incorporation, and the staff development benefits reported by the teachers. The complexity of the product is important in predicting overall organizational impacts, program incorporation, and staff development outcomes. Difficulty of Implementation is a major factor in the degree to which the problem was solved, and the overall organizational impacts.

Product characteristics are, overall, significantly more important than most current implementation theories allow. Good products not only help to create organizational effects -- student impacts, and organizational change -- but also have significant staff development spinoffs. Local materials development and adaptation, rather than facilitating implementation and institutionalization, show slight but consistently negative relationships with outcomes. This implies, we believe, based on our site visit data, that externally developed products can be implemented with only slight tinkering if the school has carefully defined what it is that they need, and has gone through a systematic process to find a product that will fit not only the problem but the local context. It is not necessary to recreate the wheel in each district in order to obtain high levels of school improvement.

C. Process Support: The Impact of External Human Assistance

Two kinds of external human assistance were provided to schools through most of the RDU projects: the services of a "linking agent", facilitator, or other generalist who was employed by the project to support the school in its activities over the entire problem solving period; and also specialized, episodic training which was typically intended to assist the school in implementing their chosen externally developed product, or in supplementing it with materials as necessary.

1) Variables Measured:

- Linking Agent variables: linking agent initiative and activity, linking agent time on site, linking agent takes a political perspective on the change process, linking agent has an innovative personality structure, linking agent takes a structural perspective on the

change process, linking agent contact with the principal.

- Other Consultant variables: amount of training, diversity of training (or number of sources from which training was provided).

2) Findings and Discussion:

Table 3 indicates that the external human assistance provided to schools can have major impacts upon the degree to which knowledge is used and new programs implemented. Technical assistance and training activities have particularly potent impacts on overall organizational change, and program incorporation, where 36% and 40% of the variance are explained respectively. Only process incorporation and personal impacts are poorly explained by the level of human assistance. (Note that it was also poorly explained by the characteristics of the product -- issues related to process incorporation will be discussed in more detail later.)

Three variables stand out as being most important, and of these, one is related to linking agent behaviors, and two are related to training. The amount of training received by the site staff prior to implementation and after implementation has a strong positive effect, and this impact is augmented by having training provided by a variety of different types of people.

The time that the linking agent spends with local site committees or "problem solving teams" is predictive of several dependent measures. Our site visits revealed that much of the importance of the agent can be attributed to the role that they played on site in both stimulating committee members to stay active and to reach decision points, and also of providing logistical support to ensure that the meetings were scheduled regularly, that suggestions for consultants were obtained, etc. Thus, the actual presence of the agent on-site was important.

There is a tendency, revealed both by the quantitative and qualitative data, for the two types of external human assistance to have somewhat different impacts on the site. Generalists and field agents have their

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*Other analyses indicate that Training provided by the developer is the most important in producing positive school outcomes, but training from other consultants, and district specialists who have become involved either to augment the developer or to provide specialized resources are also important.

greatest impacts in stimulating the school to define their problems more broadly, and to think more ambitiously about what they might do to solve them, thus producing a change program of greater scope. The specialized training from consultants, on the other hand, has more impact upon the degree to which there are actual school improvement impacts within a school: whether the problem is solved, and whether there are broader organizational changes.

D. The Impact of Internal Problem Solving Activities

The RDU approach required the participation of local school personnel in a variety of problem-solving activities. All of the RDU projects attempted to provide structures and criteria for this process although they had less direct influence over the internal process than they did on the external products that were made available or on the external human assistance intervention. The process was, however, an important feature of the RDU approach and the following features of the process were examined to determine their impact on school outcomes.

1) Variables Measured:

level of effort, quality of the problem solving process, faculty influence on the process, as well as committee or team influence, central office influence, principal influence, principal level of involvement, breadth of involvement in solution selection and breadth of involvement in solution selection.

2) Findings and Discussion:

The internal problem solving process accounts for less variance in our quantitative measures of school improvement outcomes than either the products or the external technical assistance (Table 4). This corresponds also to our analysis of case data, which suggest that many sites arrived at "successful" school improvement outcomes via a wide variety of locally designed routes. In some schools centralized decision making by the superintendent or principals was highly effective, in others, a decentralized, staff development approach worked well. Nevertheless, our statistical analysis does indicate a modest level of predictive power for internal process variables, particularly for the overall organizational change outcome, and

somewhat for process incorporation, which was not well explained by product characteristics or external human assistance.

Most of the predictive power of the internal process on school outcomes is attributable to the breadth of involvement in solution selection, and implementation, and overall faculty influence over the decision making process. It should be remembered that breadth of involvement in implementation reflects not just the involvement of the faculty and the principal within the implementating school, but also involvement on the part of the superintendent, central office specialists, and other relevant actors. A high score on this variable typically represented a district in which the central office staff took at least some interest in monitoring the implementation process, in providing support, and in spreading the new practice to other schools in the district, but did not dominate the process.

The involvement of the whole faculty in the problem solving process was, we observed on site visits, often a key element in spreading a "sense of ownership" from a small team or committee that designed and selected the innovation. Some teams were designed to increase faculty involvement, either by representing all grade levels or departments, and using respresentatives to "spread the word", or by holding special faculty meetings to discuss and vote on key decisions. Where faculty as a whole (or all of those that could reasonably be affected by the planned school improvement activities) were regularly involved, the transition between the small group that provided the legwork, and the other potential users was inevitably smoother.

One of the surprises of this analysis is the fact that principal influence was not a powerful explanatory factor. Our site visit data indicate that, in many of the most successful schools, principals facilitated the process or problem definition, solution selection and implementation, but preferred to let the process be teacher dominated. Thus, while not totally passive, they did not tend to receive the highest sccres for influence. This strategy, of course, worked only when there were active faculty who were able to take on leadership roles in promoting the process.

A final surprise is that the internal problem solving process does not predict the level of staff development benefits reported at a school. Based upon both theory and at least some of the our site visits we would have predicted that staff development benefits would have been more strongly associated with process variables such as level of effort and faculty influence.

However, staff development outcomes, at least as they are aggregated to the school level, are largely a function of the amount of training received by staff members. (Other analyses presented elsewhere suggest that staff members who are on the team do derive substantially greater staff development benefits than those who are not on the team, indicating that, for individuals who are most involved, the process may make a difference).

E. The Impact of the Intervention: Products, Process and People:

The previous sections examined the impact of each aspect of the intervention separately. Overall, the product characteristics and external human assistance each separately explained greater percentages of variance in school outcomes than the internal problem solving activities. Not surprisingly, incorporation of the problem solving process was the only outcome that was affected more by the internal problem solving activities than either of the two external interventions, although the adjusted multiple R2 was not very great (.15).

However, the impact of the RDU intervention can not be understood by only examining the three intervention strategies separately. In reality the intervention combined the three strategies, and it is therefore important to examine the potency of the combined approach. in order to do so, multiple regressions of outcomes on a set of independent variables drawn from each of the three intervention strategies were conducted. The following variables (each of which was a powerful predictor within its own group) were chosen:

- product variables: product quality, product complexity, product validated, and difficulty of implementation;
- external human assistance variables: linker/principal contact, amount of training received, diversity of training, and linking agent time on site;
- internal problem solving process variables: faculty involvement in the process, breadth of participation in solution selection, breadth of participation in implementation and the quality of the problem solving process.

2) Discussion:

Table 5 indicates that the real potency of the intervention is a function of the combination of strategies, resulting in high or very high

percentages of variance explained on each of the school outcomes. For example, adjusted multiple R2s were well over 50% for organizational impacts and for product incorporation. Even process incorporation, the most "elusive" of the school outcomes in our analyses had 24% of the variance explained by a combination of six variables drawn from each of the intervention categories.

The most important predictor variables of the combined intervention strategies are product quality (which enters into the equation for each outcome) product characteristics such as complexity and prior validation, amount of training received, faculty participation in the process and breadth of participation in solution selection and implementation.

Product characteristics and diversity of training appear to be particularly important to product incorporation. But ironically product quality and prior validation are negatively related to process incorporation. The only variable that is significantly positively associated with both program outcomes is diversity of training sources. This suggests that it may be extremely difficult to have both objectives in the same program. Both site visit and survey data suggest that the program was more successful at achieving product incorporation and spinoff effects (organizational changes and staff development effects) than process incorporation. (Note this is not the same as a high quality problem solving process, which many sites did very well as participants in this program.)

It is particularly interesting that for each outcome, the variables that contributed to the explanation of the outcome were drawn from each of the three intervention strategies. Furthermore, with the exception of one outcome, a combination of intervention strategies is a more powerful predictor of the outcome than any of the individual intervention categories (see Table 6). The one exception is the outcome of "problem solved" which is predicted better by product variables ($\hat{R}2=.46$) than by a combination of strategies ($\hat{R}2=.41$).

V. The Impact of Local Site Characteristics

Local site characteristics can be strong determinants and/or impediments to a program's outcomes. In order to determine the impact of the largely non-manipulable site conditions on the RDU school outcomes, and to compare those results with the impact of the intervention, several analyses were conducted.

1. Variables were measured in five categories:

- principal characteristics: how long in the school; teaching experience, administrative experience, and degree to which staff rate him/her as an instructional leader;
- characteristics of teaching staff: percent male; percent teaching for ten or more years in the school; average number of professional memberships; percent with an advanced degree;
- school size, structure and climate: size of district, size of school, influence of principals, teachers and superintendant over key educational decisions; school level (elementary or secondary), staff orientation to change, collegiality, tension among staff, previous experience with similar problem solving activities;
- characteristics of the community setting: index of disadvantagement among students, % students from white collar families, level of community change, rurality;
- nature of the problem: magnitude of problem, focus on classroom organization, focus on curriculum, or materials, focus on pupil performance, focus on role relations, focus on school organizational problems, focus on problems in staffing or staff characteristics, focus on pupil attitudes and behaviors.

2) Findings and Discussion:

The results of regressions of outcomes on each of these categories separately had little explanatory power. For both principal characteristics and characteristics of the community setting, there were no regressions that explained as much as 15% of the variance in any dependent variable. For teacher characteristics, only percentage of staff who are male contributed significantly to the explanation of overall oragnizational impacts. It is interesting to note that this relationships was a negative one, suggesting that male teachers (who were also more typically in secondary schools) may be particularly "independent" and resistant to an external intervention and the kinds of collaborative efforts that were a feature of the RDU program. Three structures and climate variables did explain 15% of the variance in overall organizational impact: teacher change orientation, principal influence over decision making, and teacher influence over decision making. The only category of site variables that explained three outcomes (organizational impacts, the degree to which the problem was reported to be solved, and

personal and staff development impacts) was characteristics of the problem that the sites dealt with in the program. The most important variables were a focus on classroom organization and pupil performance.

However, one further step was taken, which was to examine the combined impact of the most potent site variables (based on simple correlations as well as the regression analyses) on the school impacts. For this analysis the following variables were chosen: teacher orientation to change and teacher influence over decision making, the index of disadvantagement of students, school level, percent male staff, the degree to which the problem solving activities had begun prior to the RDU program (an index of "readiness"), and the identification of the problem as being one of classroom organization or pupil performance. As Table 7 shows, these variables do explain a relatively high percentage of variance on many of the outcomes, particularly product incorporation ($\hat{R}2$=.45) and organizational impacts ($\hat{R}2$ = .40). Personal impacts are explained least by site characteristics. Once again a highly potent variable (identification of the problem as one of pupil performance) was negatively related to process incorporation. Other variables that were predictive of both product incorporation and process incorporation are the degree of teacher influence in decision making, and the indicator of readiness.

VI. The Relative Impact of the Intervention and Local Site Characteristics

A major objective of this paper has been to examine the relative potency of the intervention as compared to the site characteristics on the school improvement outcomes. While site characteristics proved to be powerful predictors of school outcomes, Table 8 indicates that for all but one outcome measure, the power of the intervention far outweighs local site characteristics in explaining the outcomes.

We interpret this as implying that the RDU intervention was particularly effective in equalizing the inequalities in innovativeness among schools that naturally occur as a result of differences in personnel resources, community resources, prior innovative experiences, etc. (In fact, there was no significant different in outcomes based on school size, level, rurality or community turbulence, whereas the index of disadvantagement was positively correlated with outcomes.) The biggest difference is in the adjusted R2 for personal staff development outcomes ($\hat{R}2$ = .36 vs. $\hat{R}2$ = .16), followed by an

effect on organizational changes (.55 vs. .40). In other words, the spin-off effects of the program were most markedly affected by the intervention.

Only process incorporation was equally affected by both the intervention and the site characteristics, and in each case only 24% of the variance was explained by each category. How can one explain the relatively low impact of the intervention on process incorporation? While most of the RDU projects had stated objectives of permanent improvement in the general problem solving capabilities of the school case study and site visit data reveal that in fact the primary focus on the intervention was to provide assistance for engaging in a specific, targeted problem-solving process that focussed on adopting and installing a new product or practice to solve a particular problem. While some training in the generic group process or problem-solving skills was included, for most sites it seemed hard to concentrate on the capacity building function at the same time as effort was being expended to solve a particular problem. Furthermore, the linking agent or facilitator was viewed as crucial to the process, and without special project support, was not likely to be available to the local site again.

A final analysis was conducted to determine whether site characteristics add to the power of the intervention in explaining school outcomes. Step-wise regressions of outcome measures on variables representing a combination of each aspect of the intervention (products, external human assistance, and internal problem solving activities) and potent site characteristics were conducted. As Table 9 demonstrates, for all outcomes, explanatory power is increased when variables from all of the above domains are considered. Eight variables explain 68% of the variance in organizational change, and once again process incorporation is the most elusive, with 29% of the variance explained. It is particularly interesting to note that for four or the six outcomes, the variables contributing to the adjusted multiple R2 are drawn from all the domains of the intervention (products, external assistance, and internal process) as well as site characteristics. The exceptions are the degree which the problem was perceived as solved, in which no variable representing external human assistance entered at the point in which the selection was made, and process incorporation where the explanatory variables only represent the internal problem solving activities and site characteristics. In this analysis, no variables representing the external product characteristics or external human assistance contributed to the explanation of

process incorporation. This analysis reinforces the interpretation that the intervention may not have been successfully acting upon the fostering of process incorporation. Instead, the degree to which the outcome was achieved was largely a function of the internal processes (which were less influenced by the project than the external features of the intervention), and the less manipulable site characteristics themselves.

Table 1

Rank Order Correlations Between Costs and Outcomes

	Total $	% Inkind $
Organizational Impacts (N=22)	.04 NS	.49 .02
Incorporation of problem-solving process (N=21)	-.09 NS	.24 NS
Incorporation of R&D product (N=22)	.20 NS	.41 .06
Problem solved (N=21)	-.31 NS	.20 NS
Personal impacts (N=21)	-.26 NS	.39 .08

Table 2

Standardized Stepwise Regression (Beta)+ Coefficients
For the Relationship Between Product Characteristics and Six
Measures of School Outcomes
(N = 60)

Product Characteristic Variables	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Product Quality		.24**		.58**	.19	.36**
Difficulty of Implementation	.28**			.23*	.31**	
New Materials Development	-.17				-.27*	
Pre-Implementation Adaptation						-.16
Post-Implementation Adaptation				-.19		-.13
Product Validated			.35**		.22	
Relative Advantage		.20*	.20			
Match to Problem		.19		.13		
Product Complexity	.31**	.29**				.21*
Product Reversability						
Adeq. Implem. Guidance				.17		
Multiple R^2	.34	.46	.17	.51	.33	.36
Adjusted R^2	.28	.40	.10	.46	.26	.30

+ Beta Coefficients are presently only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

* $p \leq .05$

** $p \leq .01$

Table 3

Standardized Stepwide Regression (Beta)[+] Coefficients
For the Relationship of External Assistance and Six
Measures of School Outcomes
(N = 76)

External Assistance Variables	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Linking Agent (L.A.) Initiative and Activity					.24*	
L.A. Time on Site	.19	.23**			.31**	-.18
L.A. Political Perspective					-.13	
L.A. Structural Perspective						
L.A. Innovative Personality						
L.A. Contact with Principals	.16*			.13		
Amount of Training	.33**	.10	.17	.24*	.28**	.26**
Diversity of Training Sources	.25*	.43**	.22*	.31**	.19	.21*
Multiple R^2	.40	.43	.14	.21	.46	.19
Adjusted Multiple R^2	.36	.40	.10	.17	.41	.14

+ Beta Coefficients are presently only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more the order of entry was unforced.

* $p <= .05$

** $p <= .01$

Table 4

Standardized Stepwide Regression (Beta)[+] Coefficients
For the Relationship Between the Internal Problem Solving Process
and Six Measures of School Outcomes

Internal Process Variables	Organizational Impacts (n=90)	Product Incorporation (n=90)	Process Incorporation (n=76)	Problem Solved (n=76)	Scope of Implementation (n=90)	Personal Impacts (n=76)
Level of Effort					.23*	
Quality of Problem-Solving Process	.11*					
Faculty Influence on Process	.11*			.20**		.12*
Principal Influence on Process		.13				
Superintendent Influence on Process				-.20	-.15	
Other Central Staff Influence on Process			-.13*			
Breadth of Involvement in Solution Selection	.24**		.24**		.31**	
Breadth of Involvement in Implementation	.23*	.29**	.20			
Multiple R^2	.38	.15	.20	.15	.16	.05
Adjusted Multiple R^2	.34	.12	.15	.11	.12	.02

+ Beta Coefficients are presently only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or mo the order of entry was unforced.

* $p \leq .05$

** $p \leq .01$

Table 5

Standardized Stepwide Regression (Beta)[+] Coefficients
For the Relationship Between Combined Intervention Strategies and
Six Measures of School Outcomes
(N=75)

Intervention Strategies	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
(Product)						
Product Quality	.18*	.12	-.20*	.58**	.22*	.36**
Product Complexity	.29**	.15*				.28**
Product Validated		.18*	-.27**		.20*	
Difficulty of Implementation						
(External Assistance)						
Linker/Principal Contact	.17**			.13		.13
Amount of Training	.22**		.18*		.21*	.22**
Diversity of Training Sources		.30**	.23*			
Linker Time on Site		.14			.37**	-.30**
(Internal Problem-Solving Activities)						
Faculty Involvement	.09		.09	.16**		
Breadth of Involvement in Solution Selection			.20*		.16	.08
Breadth of Inv. in Implementation	.16	.21**				-.17
Quality of Process	.11*					
Multiple R^2	.59	.56	.30	.43	47	.42
Adjusted Multiple R^2	.55	.52	.24	.41	.43	.36

+ Beta Coefficients are presently only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

* $p(= .05$

** $p(= .01$

Table 6

Percentage of Variance in Outcomes Explained by Three Strategies of the Intervention and the Combined Intervention Strategies *

(N = 75)

Predictor Variables	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Product Characteristics	.28	.40	.10	.46	.26	.30
External Assistance	.36	.40	.10	.17	.41	.14
Internal Problem Solving Activities	.34	.12	.15	.11	.12	.02
Combined Intervention Strategies	.55	.52	.24	.41	.43	.36

*Adjusted multiple R^2.

Table 7

Standardized Stepwide Regression (Beta)[+] Coefficients
For the Relationship Between School Characteristics and
Six Measures of School Outcomes
(N=43)

School Characteristics	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
School Level						.23
Index of Disadvantagement						.20
Teacher Influence in Decision Making		.39**	.34**			
Teacher Change Orientation	.52**			.28*		
% Male Teachers	-.28*					
Prior Problem-Solving Activities	.21	.21*	.29*	.16	.23	
Problem in Pupil Performance	.30*	.47**	-.31*	.47**	.40**	
Problem in Classroom Organization				.27*	.39**	
Multiple R^2	.42	.50	.31	.40	.40	.24
Adjusted Multiple R^2	.40	.45	.24	.34	34	.16

+ Beta Coefficients are presently only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

* $p \leq .05$

** $p \leq .01$

Table 8

Percentage of Variance in Outcomes Explained by Combined Intervention Strategies and School Characteristics*

(N = 43)

Predictor Variables	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Combined Intervention Strategies	.55	.52	.24	.41	.43	.36
School Characteristics	.40	.45	.24	.34	.34	.16

*Adjusted multiple R^2.

Table 9

Standardized Stepwide Regression (Beta)+ Coefficients
For the Relationship Between Combined Intervention Strategies and School Characteristics and
Six Measures of School Outcomes
(N=49)

Predictor Variables	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
(Product)						
Product Quality		.18**		-.43**	.14	.26**
Difficulty of Implementation					.20	
Product Complexity	.25			-.17		.28
Product Validated	.14					
(External Assistance)						
Linker/Principal Contact	.16**					
Linker Time on Site		.16*			.43**	-.33**
Amount of Training						
(Internal Problem-Solving Activities)						
Faculty Involvement	.11*			.11		.09
Breadth of Involvement in Solution Selection			.28		.16	
Breadth of Involvement in Implementation	.21**	.37**	.25*	.21		
(School Characteristics)						
Teacher Change Orientation	.31**	.31**		.23		
Principal Influence	.27**		.19			
Prob. in Pupil Perf.		.27**	-.26*	.37**		
Prob. in Classroom Org.	.18*				.22*	.30**
Index of Disadvantagement						.20*
Multiple R^2	.73	.67	.35	.59	.60	.47
Adjusted Multiple R^2	.68	.63	.29	.53	.53	.40

+ Beta Coefficients are presently only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

* $p \leq .05$

** $p \leq .01$